Aspergillosis in Poultry

Aspergillosis is a fungal infection generally affecting the respiratory system of young poultry.

Aspergillus is a sporulated mold with broad nutritional requirements. Aspergillus fumigatus and Aspergillus flavus are the most common species causing aspergillosis in poultry. Their wide-ranging thermal tolerance makes them ubiquitous organisms on farms and in hatcheries and laboratories. Quite resistant to common disinfectants, Aspergillus can grow in solutions of sanitizing fluids and in formalin-fixed tissues.

Clinical signs
In respiratory aspergillosis, birds are seen with dyspnea (difficulty breathing), accelerated respiratory rate, and silent gasping, which is one of the most common findings in poultry (the disease has been called silent pneumonia in the past). If the nervous system is affected, birds will show incoordination and poor balance. Opacity may develop on the surface of the eyes in cases of ocular infection. Necropsy reveals white, creamy nodules in and on the air sacs and viscera (Figures 1 and 2). The nodules can be found inside the airways, especially near the syrinx, severely occluding air flow and causing the silent gasping condition. On rare occasion, the fungal masses can be found in the brain.

Figure 1. Lungs of broiler chickens with caseous nodules caused by Aspergillus. Photo credit: Dr. A.P. Da Silva.

Figure 2. Thoracic cavity of a broiler chicken with multiple nodules corresponding to infection with Aspergillus fumigatus. Photo credit: Dr. A.P. Da Silva.
Occurrence
Aspergillosis occurs in all poultry. The organisms are present worldwide, but regions with hot and humid seasons are at higher risk of developing a sufficient concentration of mold to cause clinical disease in poultry. Typically, young animals (first 2 weeks of life) are affected with acute aspergillosis. Mature turkeys can also be affected, but in this case the infection is generally chronic. It is believed that a high concentration of Aspergillus is required to produce infection; however, high bird density and reduced ventilation may also contribute.

Pathogenesis
Under certain conditions, Aspergillus can penetrate the eggshell and contaminate eggs; if the eggs break during incubation, the organism spreads into the hatchery. In ovo vaccination may present an increased risk of contamination. Heavily contaminated litter can also be the source of the infection. The conidia of Aspergillus are inhaled and deposited deep in the respiratory tract. Hyphae develop on and within the affected cells. The massive inflammatory response to the infection is linked to necrosis of the affected tissue. It is thought that Aspergillus disseminates though the blood to many tissues in the body (eyes, brain, air sacs, visceral organs, and bones). High mortality and morbidity are expected in affected young animals, whereas the opposite is true in mature birds. Interestingly, aspergillosis is not a transmissible disease (it does not spread from bird to bird).

Diagnosis
Signs and necropsy findings are generally highly suggestive of the diagnosis, which can be confirmed with culture. Growth of only a few colonies should never be considered sufficient evidence for diagnosis, because Aspergillus is ubiquitous and can contaminate plates.

Differential diagnosis
Fungus Dactylaria gallopava. Use culture to differentiate from Aspergillus.

Prevention and treatment
Collect and incubate clean eggs. Fumigate eggs before placing them in the incubator. Clean and disinfect the hatchery on a regular basis. Commercial preparations of enilconazole have been used successfully to disinfect hatcheries and poultry farms. Develop a plan to monitor the presence of Aspergillus in the hatchery. Use clean, mold-free litter and feed. There is no treatment available for commercial flocks. Cull the affected and remove contaminated litter. Disinfect the premises before getting new birds. Pet birds can be treated with ketoconazole and related drugs.

References
Diseases of Poultry, chapter 25 fungal infections.